Hearing Loss Prevention

Army Hearing Program

Readiness, Operational, Hearing Conservation, Clinical

Approved for public release, unlimited distribution

UNCLASSIFIED

BRIEFING OUTLINE

PURPOSE: To provide strategies for effectively minimizing noise-related threats on and off the job.

1. **Hearing & Noise**
2. **Hazardous Noise Levels**
3. **Hearing Protection**
4. **Audiometric (hearing) testing**
5. **Noise records (your rights)**
6. **Conclusion**

Noise Exposure Threat

- ***Permanent* Hearing Loss = Top Four Injuries in Current Operational Environment**
- Exposure to loud noise will cause hearing loss over time
- **Hearing Loss is an injury that occurs without pain**
  - No sensory nerves in the inner ear (cochlea)
  - Gradual or Sudden – no way to predict who is susceptibility to loss
  - *Always* Cumulative
- Tinnitus, or permanent ringing in the ear

Response to the threat of loud noise:
The Army Hearing Program

Readiness, Operational, Hearing Conservation, Clinical

Prevention & Education are Key

- **Understand the threat of loud noise**
- **Employ strategies to minimize the threat**

Exposure to Noise over Time

- Our ears can recover from short exposure to loud noise but, over time, permanent nerve damage will occur

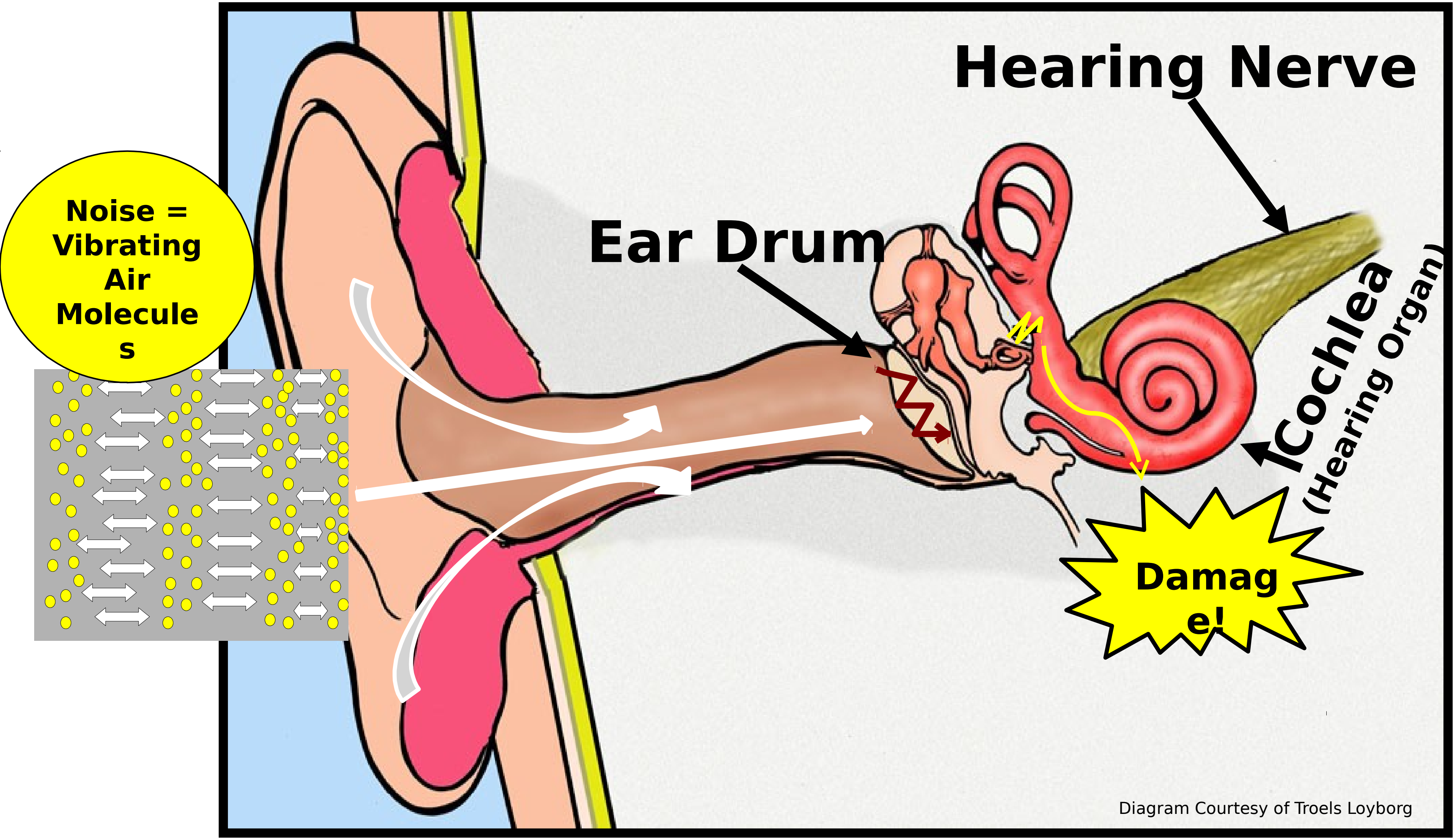
- The longer and louder the noise, the greater the chance permanent damage will occur

- Ears do *not* "get used to" the noise

CONSEQUENCES OF HEARING LOSS

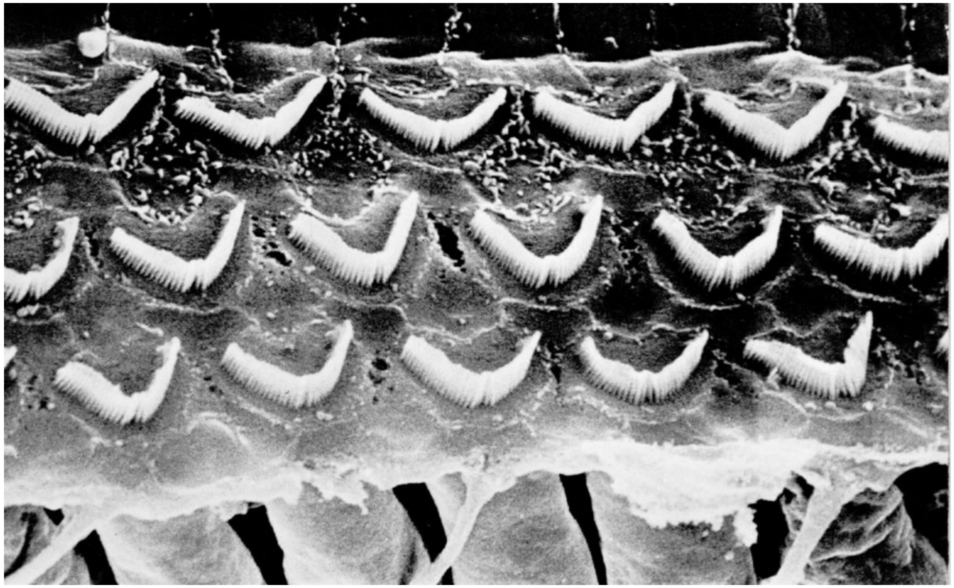
- Hearing loss from noise exposure is gradual and usually not noticed at first
- Hearing loss from noise affects your ability to hear higher pitches first (speech sounds such as “s, f, th, z”)
- Often, the first noticeable effect of hearing loss is difficulty hearing speech in noisy environments

HEARING AND NOISE

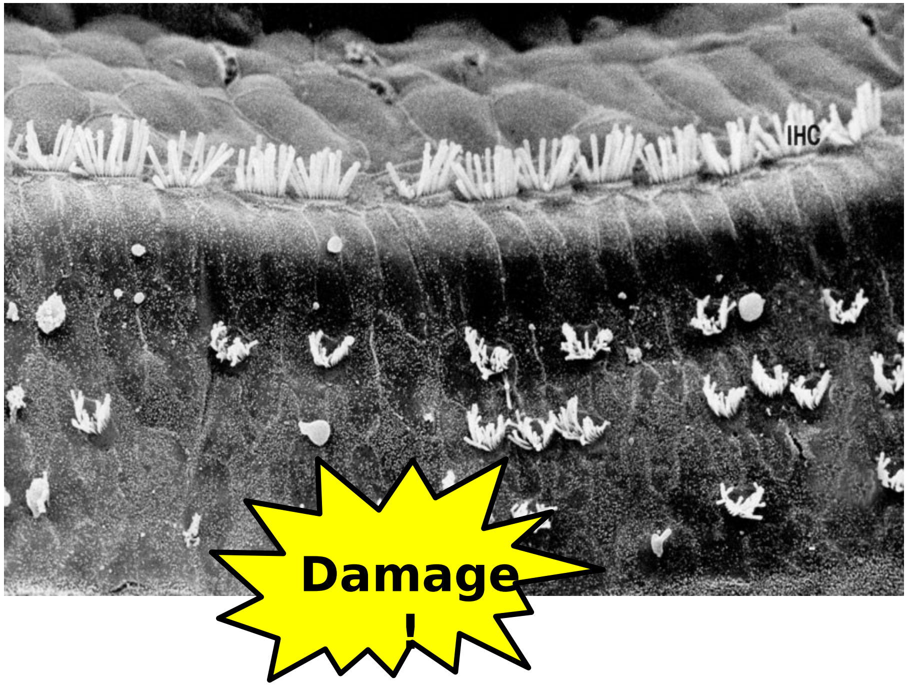


INSIDE THE COCHLEA

Healthy Hair Cells (Hearing Nerve Endings)



Hair Cells Damaged by Noise



Tinnitus from Noise Exposure

- Exposure to high noise levels can also cause permanent ringing or noise in the ear called "tinnitus"
- Tinnitus sufferers usually complain of constant whistling, squealing, roaring, or buzzing in one or both ears
- Severe tinnitus may disrupt sleep, reduce concentration, and cause irritability or depression

HAZARDOUS NOISE LEVELS

Noise Levels which Cause Hair Cell Damage:

- **Steady-state Noise > 85 dBA**
  - Steady-state Noise = Noise > ½ second in duration
    - Most generators
    - Rotary wing aircraft
    - Lawn mowers, jack hammers, circular sa
  - Tends to cause *gradual* hearing loss
- **Impulse/Impact Noise $\geq$140 dBpSPL**
  - Explosions
  - All Weapons
  - Can be *gradual or sudden* hearing loss

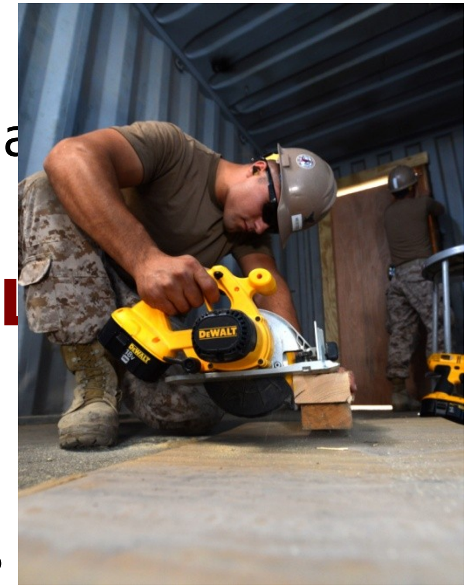
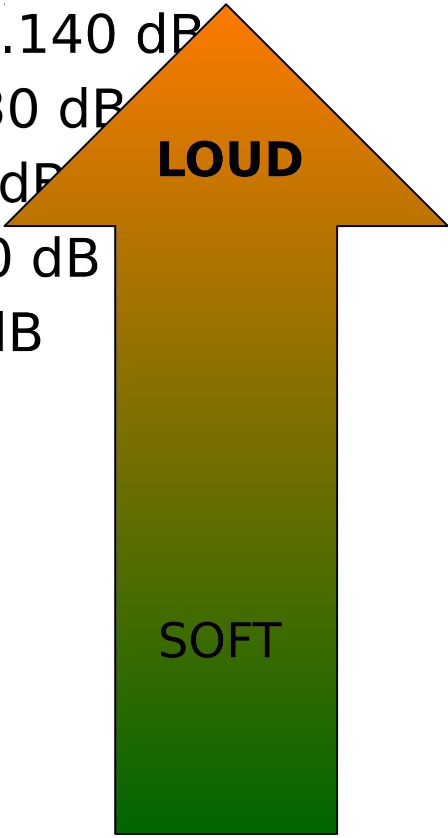


Photo Courtesy of US Navy

Noise Level Examples

- Fire crackers, weapons fire.................................140 dB
- Jack hammer...130 dB
- Jet plan...120 dB
- Rock concert..110 dB
- Snow mobile, chain saw...........................100 dB
- Tractor..95 dB
- Lawn mower, motor cycle........................90 dB
- Busy Traffic.......................................70 dB
- Normal Conversation.........................60 dB
- Quiet room....................................40 dB
- Whisper....................................30 dB



HAZARDOUS NOISE LEVELS

Three Foot Rule

(For Steady State Noise)

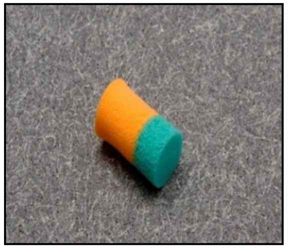
If the sound is so loud that you must raise your voice to be understood at a distance of three feet it is…

POTENTIALLY HAZARDOUS

Fact: *The exposure to engine noise in a 4-hour convoy can be as damaging to hearing as one IED*

HEARING PROTECTION

- **Earplugs**
  - **Pre-formed**
    - **Single Flange**
    - **Triple Flange**
    - **Quad Flange**
    - **Combat Arms Earplugs**
  - **Hand-formed (foam)**



- **Proper Fit:**
  - **Pull Back on Ear to Straighten Ear Canal**
  - **Vacuum Seal – hollow sounding or like you have a “head cold”**

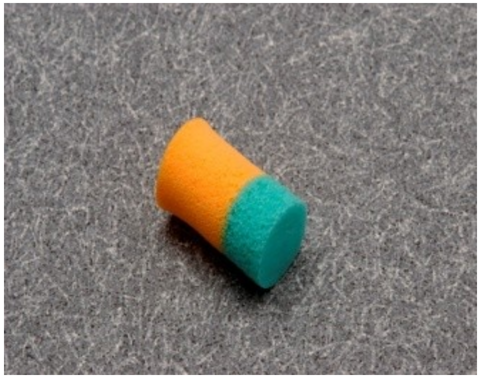
- **Earmuffs**
  - **Adjust headband for a snug fit**
- **Combat Arms**
  - **Flattened switch for engines, generators, vehicles**
  - **Open switch for metal-on-metal, weapons fire**

How's the fit?

Triple Flange Earplugs with Insertion Tool

How's the fit?

Bi-Colored Foam Earplug



Hearing Protection in Background Noise

- Using earmuffs or plugs in noisy are can actually make it easier to hear coworkers or machinery

- Hearing protectors reduce loud background noise; decreasing worker stress from noise,
and improving communication

Photo Courtesy of CDC PHIL

Audiometric (Hearing)Testing

- Establish individual fitness for duty
- Detect changes in hearing early
- Ensure proper medical referrals and diagnoses
- Monitor the effectiveness of the local hearing program to keep employees safe
- Comply with Federal regulations (OSHA)

Audiometric Testing

- **Audiometric testing results can be used to check the following:**
  - The adequacy of hearing protection being used
  - A diagnostic hearing evaluation determines whether a hearing loss is present, the type of hearing loss, and whether a referral to a medical doctor is necessary

Noise Measurements

- Noise measures are made to evaluate the potential for an exposure to cause hearing loss
  - A person's total involvement with noise, not just a momentary level

Noise Level, dBA	Permitted daily exposure time
85	8 HOURS
88	4 HOURS
91	2 HOUR
94	1 HOUR
97	30 MINUTES
100	15 MINUTES
103	7.5 MINUTES

Recordkeeping

- Employers are required by OSHA to keep all records involving noise measurements for at least two years
- Employers are required by OSHA to keep any information regarding employee testing and training for the duration of employment
- OSHA also requires the employer to maintain records of any employee who is documented to have a decrease in hearing

CONCLUSION

- Noise induced Hearing Loss is NOT inevitable
- Using hearing protection is crucial to preventing hearing loss
- The ability to understand speech *increases* when background noise is reduced
- You have the right to see noise measurement records and get copies of your hearing test results

Hearing Loss is:

Painless

Permanent

Progressive

Preventable!